

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number
WO 2004/041541 A1

(51) International Patent Classification⁷:
A47F 5/11 // B23K 26/38, B32B 29/08

B41J 2/01.

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:

PCT/SE2003/001710

(22) International Filing Date:

5 November 2003 (05.11.2003)

(25) Filing Language:

Swedish

(26) Publication Language:

English

(30) Priority Data:

0203251-4 6 November 2002 (06.11.2002) SE

(71) Applicant (*for all designated States except US*): DESIGN FORCE AB [SE/SE]; Box 409, S-601 05 Norrköping (SE).

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SI, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): ALDÉN, Kurt [SE/SE]; Skogsbovägen 8, S-616 33 Åby (SE).

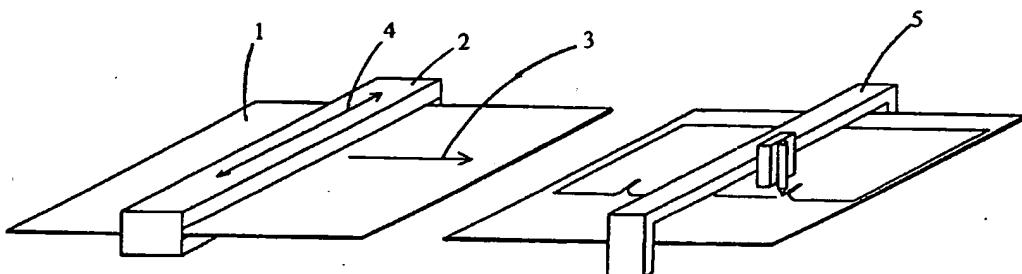
(74) Agent: AWAPATENT I LINKÖPING AB; Platensgatan 9 C, S-582 20 Linköping (SE).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD TO PRODUCE GRAPHICALLY AND TWO-DIMENSIONALLY DESIGNED PIECES



WO 2004/041541 A1

(57) Abstract: The present invention relates to a method of using an ink-jet printer (2) to apply a graphic design pattern to substantially plane workpiece (1) and then using a laser cutter (5) to make through-cuts in the workpiece (1) so that items with a two dimensional design are created, which are assembled into a three-dimensional, self-locking and self-supporting construction, without the need for conventional assembly elements, according to a predefined three-dimensional pattern.

METHOD TO PRODUCE GRAPHICALLY AND TWO-DIMENSIONALLY DESIGNED
PIECES

The present invention relates to a method according to the pre-characterising part of
claim 1.

5

Background of the invention

Most shops have a need to alter or renew their interior fittings at regular intervals, one
example being clothing shops before a new clothing season. Such alteration or renewal
10 must preferably not take long to carry out. In many shops there is also a desire to
incorporate advertising into the fittings. The type of shop fittings required can vary from
one shop to another, just as the choice of furnishings varies according to people's tastes
when furnishing our homes. For example, there may be a need to modify the size and
dimensions of furniture according to the space to be fitted out.

15

Nowadays most shops have fittings, that is to say counters, shelving and the like of
timber material, for example, which are conventionally assembled using bolts and nuts,
for example. This also applies to furniture in the home. The material is heavy and
assembly of the fittings/furniture takes a relatively long time, whilst the fittings and/or
20 items of furniture are not completely recyclable. Furthermore, there is not much scope
for flexibility in the design construction of the fittings or furniture. Any advertising in
shops often comes in the form of separate advertising posters or signs.

Object of the invention

25

The object of the present invention is to provide a method of creating two-dimensional
graphic design items sequentially on one and the same line.

30

This object is achieved by a method of the generic type in that the invention has the
characterising features according to claim 1.

The method according to the invention furthermore enables the two-dimensional graphic design items to be assembled into a three-dimensional construction that is self-locking so that no bolts or nuts are required.

5 The method according to the invention moreover affords the advantages that the material and hence also the assembled three-dimensional construction is lightweight and can be made fully recyclable. The material can moreover be made water-repellent. Since the graphics are incorporated into the design construction, this also affords the advantage that no separate advertising is necessary.

10

Brief description of the drawing

The invention will be explained below with reference to the drawing, in which:

15 Fig. 1 shows a sequential two-dimensional graphic design process on a workpiece,

Figs. 2 to 8 show an example of an assembly of two-dimensional graphic design items into a self-supporting and self-locking three-dimensional construction, and

20 Fig. 9 shows an example of the graphics incorporated into the design construction.

Description of the invention

Fig. 1 shows how a substantially plane workpiece 1 moves in a conventional ink-jet printer 2, shown from left to right in the figure as illustrated by the arrow 3, whilst the ink-jet printer applies a graphic pattern to the surface of the workpiece 1 as the ink jets move transversely over the workpiece 1, as shown by the arrow 4. The ink-jet printer 2 is digitally controlled, which means that the appearance of the graphic pattern can be readily modified by means of a computer. Once the graphic pattern has been applied to 30 the surface of the workpiece 1, the workpiece 1 continues its advance, shown from left to

right in the figure, and reaches a conventional laser cutter 5. The laser cutter 5 cuts out items 6 of predefined shape from the workpiece 1. The laser cutter 5 is also digitally controlled, which makes it possible to easily modify the shapes of the cut-out items 6. Since the two-dimensional graphic design process is performed sequentially in one and 5 the same line, the processing of the workpiece 1 can be managed by one and the same operator.

The workpiece 1 is made of corrugated board, which is a laminate material comprising 10 two substantially parallel covering layers of paper material and a core of corrugated fibreboard placed between the covering layers, and at least one diffusion layer. Such a material is described, for example in patent application SE0200903-3. The material is suited to use as a construction material for fittings, furniture and other load-bearing constructions. It is furthermore a lightweight material, which facilitates any transporting 15 of the items 6. The material is also recyclable in existing recycling systems, which meets the environmental requirements according to Agenda 21. The material has the advantage over other prefabricated component materials that it has a fire classification. This is of particular importance in the method according to the invention, since the laser cutting process carries a high combustion risk. It has now been shown that the corrugated board is not ignited by the laser cutting.

20 The two-dimensional graphic design items 6 can then be packed in packagings suited to this purpose. Since the items 6 are substantially flat, they are preferably packed one on top of another in order to make optimum use of the packing space. After packing, the items 6 are suitably transported to the location where the items 6 are to be assembled, for 25 example to a shop.

Figs 2 to 8 show an example of an assembly of two-dimensional graphic design items 6 into a self-supporting and self-locking three-dimensional construction 7. In this example 30 the construction 7 takes the form of a baker with a box which is intended to be filled with bread. Since no separate assembly elements, such as bolts and nuts, are needed,

assembly of the items 6 to form the construction 7 is a relatively quick operation. Moreover, since the construction 7 is self-locking no labour-intensive or time-consuming removal of the conventional assembly elements, such as bolts and nuts, from the construction 7 is required should the material be recycled.

5

Fig. 9 shows how the graphics are incorporated into the construction 7 in the example above, in which the graphics may have advertising purposes. This obviates the need for separate advertising signs or advertising posters.

- 10 In one embodiment of the present invention any visible edges in the construction undergo conventional edge treatment before assembly, which may consist, for example, of thin strips of suitable material being adhesively bonded to the visible edge, possibly in combination with heat treatment.
- 15 The aforementioned material can also undergo a conventional lamination process, which makes the construction 7 moisture-resistant. The workpiece 1 can undergo the lamination process either before the graphic pattern is applied and before the graphic design items 6 are cut out or after both these operations. An alternative to conventional lamination is for the workpiece 6, the graphic design items 6 or the construction 7 to be 20 coated with liquid lacquer or a moisture-resistant paint.

- 25 The assembly of two-dimensional graphic design items 6 into a construction 7 in the form of a baker with a box is described above. Since it is easy to modify the predefined two-dimensional graphic design process performed on the items 6 in the ink-jet printer 2 and the laser cutter 5, the method according to the present invention affords great scope for designing the items 6 to the client's special requirements. Thus it is possible to assemble most three-dimensional constructions without departing from the scope of the present invention. The graphic design, for example, need not have advertising purposes but may simply serve as decoration of furniture, for example, manufactured by the 30 method according to the present invention.

Claims

1. Method of producing through-cuts according to a predefined pattern in a substantially plane workpiece (1), which bears a pattern of predetermined graphic design, thereby creating two-dimensional graphic design items (6), **characterised in that the chosen workpiece is corrugated board on which the following operations are performed sequentially in the following order.**
 - A the graphic design pattern is applied to the workpiece (1) by means of an ink-jet printer (2), and
 - B the through-cuts are produced in the workpiece (1) bearing the graphic design by means of a laser cutter (5).
- 15 2. Method according to Claim 1, **characterised in that the two-dimensional graphic design items (6) are assembled into a three-dimensional construction (7) according to a predefined three-dimensional pattern.**
3. Method according to Claim 2, **characterised in that the three-dimensional construction (7) is made self-locking.**
- 20 4. Method according to any one of Claims 2-3, **characterised in that an edge treatment is performed at least on visible edges of the three-dimensional construction (7).**
- 25 5. Method according to any one of Claims 2 to 4, **characterised in that the construction (7) is made water-repellent.**

Fig. 1

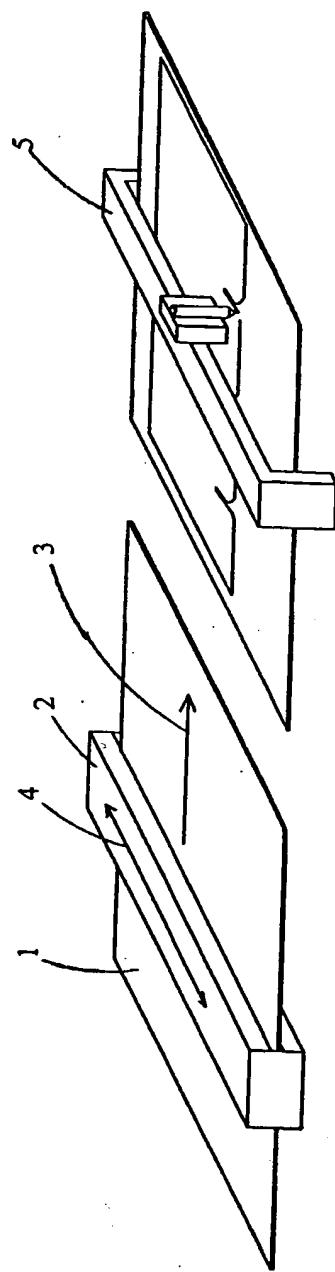


Fig. 3

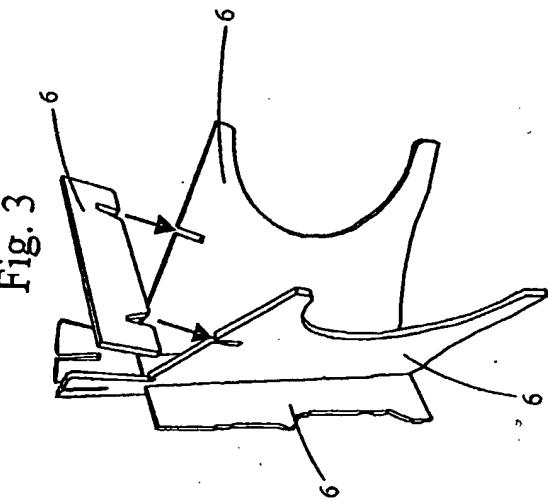


Fig. 2

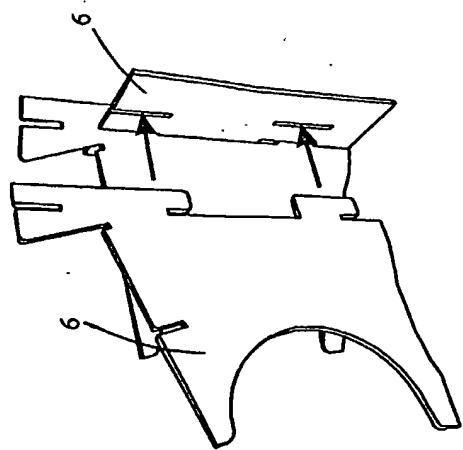


Fig. 5

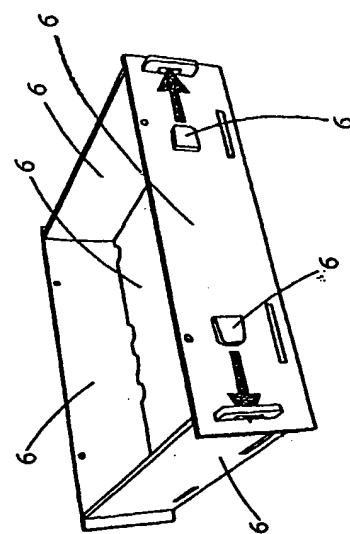


Fig. 4

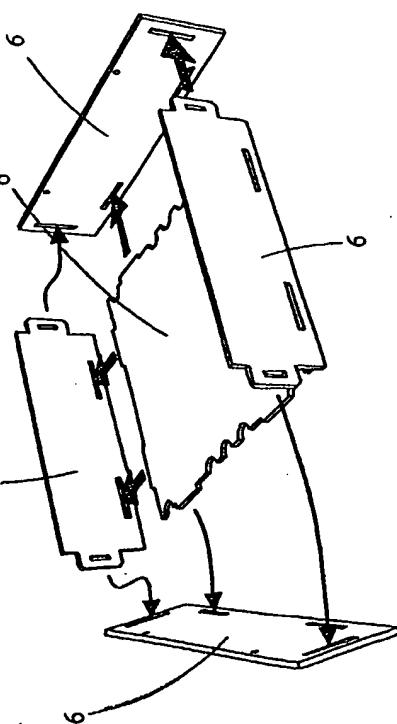


Fig. 8

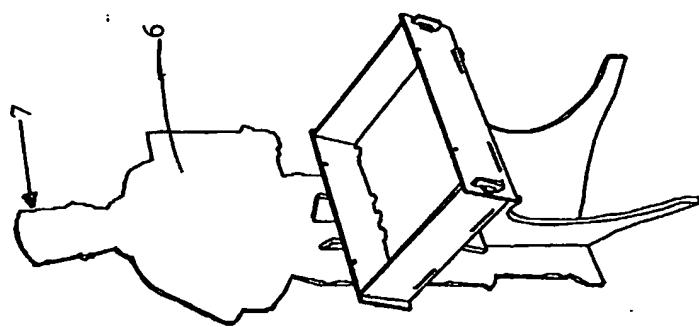


Fig. 7

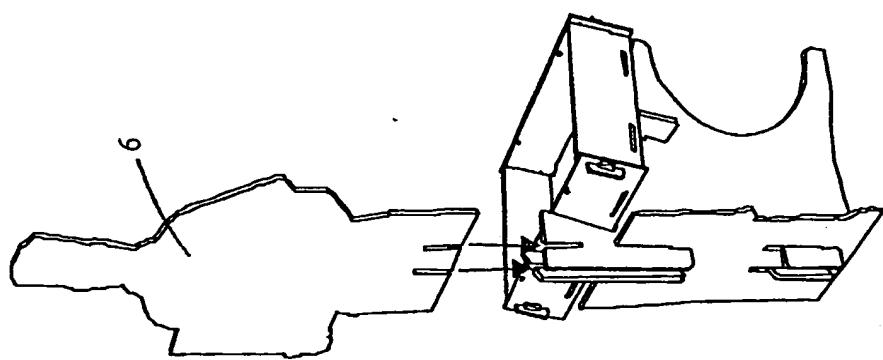


Fig. 6

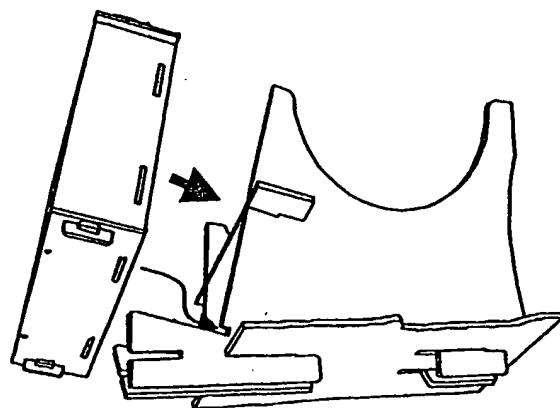
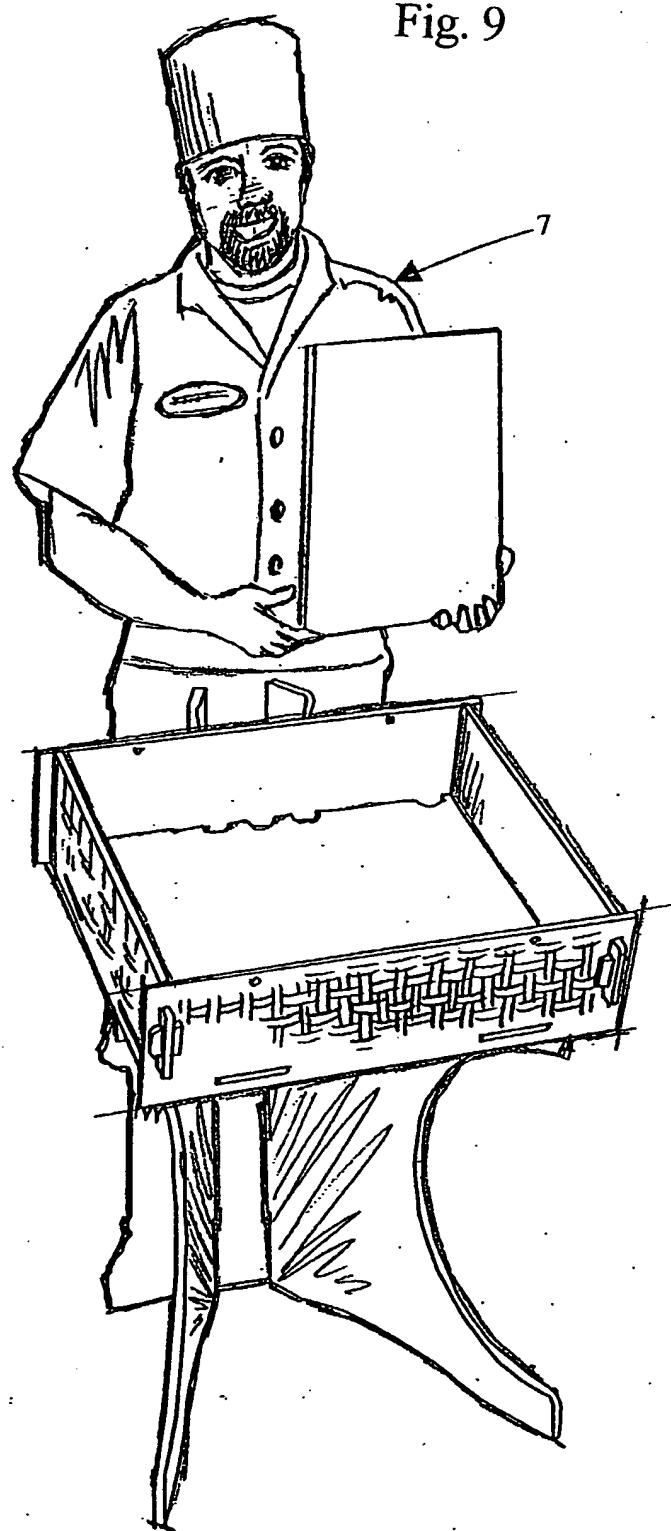


Fig. 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2003/001710

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B41J 2/01, A47F 5/11 // B23K 26/38, B32B 29/08
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A47F, B41J, B43K, B32B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 0138097 A1 (ENCAD, INC.), 31 May 2001 (31.05.2001), page 8 - page 9, figures 1-5	1
Y	--	2-5
X	EP 0950752 A1 (GERBER TECHNOLOGY, INC.), 20 October 1999 (20.10.1999), column 1, line 46 - line 59; column 5, line 27 - line 32, figures 1-6	1
Y	--	2-5
Y	US 6109329 A (RUSSO), 29 August 2000 (29.08.2000), column 5, line 4 - line 61, figures 1-20	2-5
	--	

Further documents are listed in the continuation of Box C.

See patent family annex.

- * Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

3 February 2004

Date of mailing of the international search report

13-02-2004

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Inger Löfving / JA A
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No. PCT/SE 2003/001710

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0746140 A1 (MAX CO., LTD.), 4 December 1996 (04.12.1996), column 4, line 21 - column 5, line 11, figures 1-4 --	1-5
A	GB 153425 A (HORACE STANLEY CORDWELL), 11 November 1920 (11.11.1920), whole document --	1-6
A	FR 1350885 A (SOCIETE DE CARTONNAGES D'ECHANTILLONNAGE ET DE RELIURE D'AUBERVILLIERS (SCERA)), 23 December 1963 (23.12.1963), whole document --	1-6
A	EP 0357841 A1 (LEEUWARDER PAPIERWARENFABRIEK B.V.), 14 March 1990 (14.03.1990), whole document -----	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

24/12/2003

International application No.

PCT/SE 2003/001710

WO	0138097	A1	31/05/2001	AU EP	4304201 A 1227936 A	04/06/2001 07/08/2002
EP	0950752	A1	20/10/1999	DE JP JP US	69901044 D,T 3113243 B 2000008216 A 6173211 B	14/11/2002 27/11/2000 11/01/2000 09/01/2001
US	6109329	A	29/08/2000	US	6453973 B	24/09/2002
EP	0746140	A1	04/12/1996	JP JP KR	3039320 B 8328779 A 160393 B	08/05/2000 13/12/1996 01/05/1999
GB	153425	A	11/11/1920	NONE		
FR	1350885	A	23/12/1963	NONE		
EP	0357841	A1	14/03/1990	SE AT CA DE ES JP JP US	0357841 T3 102119 T 1324420 A,C 3888179 D,T 2051829 T 2107433 A 2522553 B 5001325 A	15/03/1994 16/11/1993 30/06/1994 01/07/1994 19/04/1990 07/08/1996 19/03/1991